

THE EFFECTS OF CATTLE POACHING ON INSECTS LIVING AT THE MARGIN OF THE RIVER ITCHEN, HAMPSHIRE

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An important factor affecting the entomological interest of stream and river margins is the amount of disturbance to the banks. Streams with a natural flow regime are subjected to annual disturbance by high flows, resulting in regularly regraded shores and eroding banks. This disturbance has been much reduced as a result of bank reinforcement and flood alleviation work. One mechanism that can partially replace the natural process is trampling (poaching) by cattle. Trampling promotes a diverse fauna at the margins of ponds and ditches on soft substrates (Biggs *et al.*, 1994; Dolman, 1993; Drake, in press). However, it is also known that trampling harms the specialized beetle fauna of the shoals of stony rivers and the bare shores of rivers draining catchments on rocky substrates (Lott, 1992). Between these two extremes of still waters on soft sediments and rivers on hard rocks, there is presumably a change in best management practice for insects of the margins. For instance, it is uncertain what the best recommendation is for chalk streams.

A brief survey was undertaken to see whether there was an obvious answer to this problem. The reasons for looking at chalk streams is that fishing syndicates blame cattle trampling for damaging salmonid fishing (Summers, 1994), but it is likely that low flows of the recent droughts are more culpable than a change in the response of the rivers to disturbance by cattle. Several chalk streams, including the River Itchen, are currently being notified as Sites of Special Scientific Interest so the information will be useful when advising on conservation management.

SITES AND METHODS

Six sites along the River Itchen were selected to include banks with and without cattle access. They were visited on 8 and 9 July 1994. Full details of the sites are given in Drake (1995). Briefly, they were four stations at the Itchen County Park (grid reference 41/4617), four stations at Twyford Moors near Colden Common (41/4722), two stations at Winnall Moors SSSI (41/4830 and 41/4930), one station at each of Itchen Stoke (41/5432) and Ovington Mill (41/5631), and three stations on the Candover Stream, a tributary of the Itchen near Abbotstone (41/5634).

Insects were sampled at the water margin using a sweep net, supplemented by direct capture using a pooter. Although a wide range of taxa was taken, only flies, caddis and dragonflies were identified in all samples. Occasional beetles, bugs, crickets and stoneflies were identified.

Species were allocated to simple habitat groups based on their known biology. The categories were streams, ponds, water margins, fen and other wet places but not necessarily the water edge, grassland and woodland. The habitat of some species was unknown and others were "tourists" in the river margin context, although they may have been specific to other habitats such as heathlands.

RESULTS

Two hundred and forty species were identified, dominated by 210 flies. Craneflies (Tipuloidea) were not kept in their separate stations and were later identified by Alan Stubbs. A full species list is given in Drake (1995). Four red data book (RDB) species and 12 nationally scarce species were recorded (Table 1). One of these, the

scathophagid fly *Cosmetopus dentimanus*, was the second British record (Drake & Ball, in press). Nine of the nationally rare or scarce species are associated with water margins. These species were found most often on unfenced water margins although a few were also found along fenced sections. Another three species are found in fenland or wet grassland and one in grassland, and these were found mainly along fenced sections of stream-bank. None of the rare or scarce species was found with any great frequency. The southern damselfly *Coenagrion mercuriale* was present at three of the four sampling stations at Itchen County Park where it has a thriving colony (Mayo & Welstead, 1983, and subsequent observations) and the empid *Hilara woodi* was found at two stations at Twyford Moors and at the Candover Stream. Two craneflies normally found in carr woodland, *Limonia lucida* and *Pilaria fuscipennis*, may have strayed from their more typical habitat.

Some nationally uncommon species were frequently recorded. The sepsid *Themira superba* (Hal.), whose larvae probably feed in dung-enriched wet mud, was particularly common at most trampled sites but absent from fenced margins. *Parydra aquila* (Fallén), an ephydrid whose larvae probably live in shallow water or saturated margins, was also found mainly at trampled stations. Two dolichopodids had contrasting preferences, *Dolichopus campestris* Meig. being found only at fenced stations, whereas *Syntormon denticulatus* (Zett.), in common with most other dolichopodids, was present mainly at trampled sites. Several other frequently recorded species were probably no more frequent at trampled sites than at fenced ones: the hoverfly *Neoascia tenur* (Harris), the empids *Platypalpus pallidicornis* (Collin) and *Hilara obscura* Meig., the dolichopodid *Teuchophorus spinigerellus* (Zett.) and the scathophagid *Cleigastra apicalis* (Meig.). The location of capture of craneflies was not known so their association with fenced or unfenced margins could not be assessed. However, *Helius flavus* (Walk.), a species associated with emergent

Table 1. Nationally scarce (notable) and rare (red data book, RDB) species recorded from several sites along the Itchen valley. National statuses are defined in Ball (1994) and were obtained from Recorder (Ball, 1992); the prefix "p" indicates a provisional status. ICP—Itchen Country Park; TM—Twyford Moors; WM—Winnall Moors; IS—Itchen Stoke; OM—Ovington Mill; CS—Candover Stream.

		Status	ICP	TM	WM	IS	OM	CS
ODONATA								
Coenagiidae	<i>Coenagrion mercuriale</i> (Charp.)	RDB3	*					
DIPTERA								
Tipulidae	<i>Limonia lucida</i> (de Meijere)	Notable					*	
	<i>Pilaria fuscipennis</i> (Meig.)	Notable		*				
	<i>Cheilotrichia imbuta</i> (Meig.)	Notable		*				
Stratiomyidae	<i>Beris fuscipes</i> Meig.	Notable					*	
	<i>Oxycera morrissii</i> Curt.	Notable				*		
	<i>Vanoyia tenuicornis</i> (Macq.)	Notable	*					
Hybotidae	<i>Platypalpus infectus</i> (Collin)	pRDB3			*			
	<i>Syneches muscarius</i> (F.)	pRDB2			*			
Empididae	<i>Hilara woodi</i> Collin	Notable		*				*
Dolichopodidae	<i>Hercostomus plagiatus</i> (Loew)	Notable					*	
	<i>Campsicnemus pectinulatus</i> Loew	Notable	*	*				
Syrphidae	<i>Neoascia geniculata</i> (Meig.)	Notable		*	*			
Lauxanidae	<i>Sapromyza opaca</i> Becker	Notable		*				
Chloropidae	<i>Elachiptera pubescens</i> (Thalh.)	Notable	*					
Scathophagidae	<i>Cosmetopus dentimanus</i> (Zett.)	RDB1		*				

Table 2. The mean percentage ($\pm 95\%$ confidence limits) of species in four habitat groups at fenced and unfenced margins. n = number of stations.

	Number of species	Unfenced ($n=10$)	Fenced ($n=4$)
Water edge species	80	51.3 \pm 7.3	36.8 \pm 9.9
Fen species	33	14.8 \pm 3.9	17.5 \pm 7.4
Grassland species	36	20.0 \pm 3.7	24.3 \pm 8.3
Tourists	22	9.5 \pm 5.0	12.5 \pm 6.7

plants, was widespread, showing that its habitat was not eliminated by grazing, for example at the Candover stream which had a broad fringe dominated by yellow iris *Iris pseudacorus* L. and reed canary grass *Phalaris arundinacea* L.

There were differences in the frequency of occurrence of some common species between fenced and unfenced stretches. Water-margin species that were most often found on trampled margins were the saldid bug *Saldula saltatoria* (L.), a predatory species that hunts over bare mud, the empid *Clinocera stagnalis* (Hal.) whose larvae probably develop on saturated margins or in shallow water and whose adults sit about on muddy margins, the dolichopodid *Syntormon pallipes* (F.), the ephydrid *Scatella paludum* (Meig.) whose larvae develop in saturated mud and whose adults abound on its surface, the muscid *Lispe tentaculata* (Deg.) whose adults hunt on bare mud, the sepsid *Themira minor* (Hal.) and the scathophagid *Norellisoma spinimanum* (Fallén). The only species in this water-margin group that was obviously more frequent at fenced sites was *Anthomyza collini* Andersson, which is an anthomyzid inquiline of galls of other Diptera in tall emergent plants such as common reed *Phragmites australis* (Cav.) Trin., so it is not surprising that this species was not favoured by grazing. The craneflies *Erioptera fusculentata* Edw., *E. fuscipennis* Meig. and *E. trivialis* Meig. are usually abundant at sites with bare mud (A. Stubbs, pers. comm.) and were numerous at trampled sites including Candover Stream and Itchen Country Park. They were absent from Itchen Stoke where there was limited bare mud, but instead bare chalk where the bank was grazed.

Among the grassland species that showed clear differences in occurrence between fenced and unfenced sites were the sepsids *Sepsis cynipsea* (L.) and *S. orthocnemis* Frey, and the scathophagid *Scathophaga stercoraria* (L.), which all develop in cattle dung, and the soldierfly *Chloromyia formosa* (Scop.) whose larva is a detritivore in grassland; all were more frequent where stock had access. Species that were more abundant at fenced sites were the opomyzid *Opomyza petrei* Mesnil and perhaps also the chloropid *Cetema neglecta* Tonnoir, both of which have grass-mining larvae.

In general, most of the common species were not obviously distributed differently between fenced and unfenced sites, even though their biology suggests that they might prefer one type to the other. However, casual observations made while collecting the samples suggested that some grassland species were more numerous in the taller vegetation by fenced margins, and that some water-margin species were particularly abundant at trampled sites, even though a few individuals were also found at fenced sites.

Because sampling effort was uneven, the numbers of species in each of the habitat groups was expressed as a percentage of the total recorded, and these were compared between fenced and unfenced margins. Most groups were represented by too few species to show any real differences, but species of water edge, fen and grassland, and tourists were numerous (Table 2). The sample from Ovington Mill was excluded because the site was atypical, being next to scrubby, ungrazed fen. Although none of the mean values were significantly different, there was a notably larger percentage of

water-edge species along unfenced margins than along fenced margins. There was a similarly large, although non-significant, difference in the percentage of uncommon and scarce water-edge species alone between unfenced and fenced margins ($17.4 \pm 7.6\%$ and $11.0 \pm 12.1\%$, respectively). The percentages of fenland and grassland species were much the same for both groups of sites.

DISCUSSION

The survey showed that the river-edge fauna contained some nationally rare or scarce species. Most of these were found on unfenced margins where cattle had trampled the edges and partially grazed the taller vegetation. Unfenced margins also supported a slightly greater proportion of water-margin species, both common and uncommon, than did unfenced edges. Few species of note seemed to be more frequent at fenced sites and none was apparently confined to these.

Mild trampling helps to restore some of physical diversity lost through flood defence work and other modifications made to improve conditions for salmonid fishing. If the river was allowed to develop a natural pool and riffle structure, there would be plenty of areas of bare silt left by normal deposition processes, and perhaps areas of sparse vegetation suppressed by annual inundation. These features would be interspersed with margins dominated by tall vegetation, forming a linear matrix where each species would be able to find its niche. Fast-flowing water and a clean, silt-free bottom, suitable for fish and aquatic invertebrates that require these conditions, would also be present. In the absence of a natural flow regime, allowing stock access to parts of the banks replaces this natural variation, at least in the structure of the bank where much of the invertebrate interest of these rivers lies. It is not suggested that the whole length of the river should be subjected to trampling or that it should be heavy and damaging, as undoubtedly it is along some stretches of this river. Only one station in this survey had been damaged by trampling (at Itchen Country Park) and all the others had a more diverse physical structure as a result of the cattle's activity. Low-intensity grazing along, say, half of the river's length would achieve the desired result.

The tentative conclusion that lightly cattle-trampled margins are superior habitat to fenced margins for river-edge species needs to be tested more rigorously using a wider selection of lowland rivers and invertebrate groups.

ACKNOWLEDGEMENTS

I thank Dr Jon Cox for instigating this survey and arranging access.

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LETTER TO THE EDITOR

County names.—I was interested to read the editorial on county names (*Br. J. Ent. Nat. Hist.* 1995; 8: 27–32). For over 30 years I have kept all my records of insects on 5" × 3" filing cards (over 50 000 of them by now!) and have always filed them in drawers under the vice-county names. I take no notice of the modern administrative county names as they cover too big an area. It is almost useless to have a record simply listed as "Gwynedd" when this county stretches for 100 miles from N. Anglesey to S. Merioneth.

Referring to Gwynedd, which includes Anglesey, Caernarfonshire and Merioneth, I am puzzled by the omission of this name from the list when Clwyd, which covers Denbighshire and Flintshire in North Wales (not "several" former counties) is included. Also baffling is the reference to Caernarfonshire as the mainland part of VC 49; this vice-county is *only* mainland, apart from Bardsey Island at the tip of the Llyn Peninsula, and one or two tiny little islets. The reference at this point to Anglesey is confusing; while it is now included in Gwynedd, it was never part of Caernarfonshire.

One of the name problems I have found, especially in the older journals, is the use of "Caernarfon" (or "Caernarvon"), "Flint" and "Denbigh" where it is not at all clear from the context whether the reference is to the town of Flint or the county of Flintshire. To avoid this confusion I always abbreviate the counties as Caerns., Flints. and Denbs., which makes it quite clear that one is not referring to the county towns. The terminal s is used in this way in, for example, the abbreviation of Bedfordshire so as not to confuse it with the town of Bedford. Of course this confusion would not arise if grid references and more details were added, but they are not always provided.—JOAN MORGAN, School of Biological Sciences, University of Wales, Bangor, Gwynedd LL57 2UW.

Reply by the Editor.—My thanks to Joan Morgan for her astute observations. Of course, Gwynedd should have been in the list of names, but luckily is short enough not to warrant any abbreviation. Hopefully references to Denbigh and Caernarfon (or Caernarvon) will always signify the towns, while Denb. and Caer. the vice-counties. However, the possible confusion over Flintshire would be solved by accepting Flints. as the vice-county abbreviation. Buck's original list was only of "suggested abbreviations" and this is all I can claim for my revision. Although I hope the list can form a basis for conserving space in the journal, it must to some extent remain up to individual authors to try and avoid needless confusion between similar sounding place names.—RICHARD A. JONES, 13 Bellwood Road, Nunhead, London SE15 3DE.